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FINANCIAL RATIOS AS PREDICTORS OF BUSINESS FAILURE

by

© ROY ALLAN SWANSON

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled 'Financial Ratios As Predictors of Business Failure', submitted by Roy Allan Swanson in partial fulfilment of the requirements for the degree of Master of Business Administration.

ABSTRACT

The object of this study was to (1) determine the degree to which trade suppliers for small business firms used financial ratios as a tool for analyzing credit risk and (2) examine if financial ratios could safely be considered as predictors of failure. In order to accomplish these objectives a sample of unsuccessful firms and a sample of successful firms were selected from the residential and small commercial builders of the construction industry in a Central Alberta Community.

Fourteen important financial ratios were computed from the financial data of the successful and unsuccessful firms. The financial ratios of the two groups of firms were compared to determine if differences between the ratios of the two groups were significant and if they could predict failure before the actual event.

Seven of the fourteen ratios which were computed, appeared to be useful as predictors of failure. The short-term and the long-term risk ratios showed a definite trend toward financial difficulties in the two years prior to failure. The other ratio that also appeared to indicate failure was the sales to inventory ratio. Generally, the study indicated that certain financial ratios could be used as predictors of failure if an appropriate standard was found for making comparisons.

Also, trade suppliers from the same community were interviewed to determine the degree to which they used financial ratios. It was found

that most of the trade suppliers used ratio analysis to some extent, although much of the use of ratio analysis appeared to be informal. The large creditors used ratios more frequently and understood them better than the smaller creditors.

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CHAPTER I

INTRODUCTION

A difference of opinion exists regarding the effectiveness of financial ratios as a means of analyzing business firms. Studies have been undertaken to determine the value of financial ratios as an analytical device, particularly as a means of predicting failure of firms some time before the actual event. However, the findings of these studies have been inconclusive in many respects. The main problem with ratio analysis appears to be the inability of finding an appropriate standard that can be safely used for making comparisons.

Important studies that have been conducted to analyze business failures do not segregate the failed firms into homogeneous groups from the viewpoint of size, industry, and location. Thus, varyingfactors are introduced into the sample of firms selected for these studies which may distort the financial ratios to an extent that they fail to represent the financial position of a firm relative to those firms existing under different conditions. The findings under this situation may not be pertinent to a region where economic conditions are different from those under which the studies were made. This raises an important question whether by ignoring the differences in the size of firm, location, and industry these studies are meaningful to an average firm and if they are of any value to an average creditor in determining credit risk.

The purpose of this study is to (1) determine the degree to which trade suppliers for small firms use financial ratios as a tool for analyzing credit risk, and (2) examine if financial ratios can safely be considered as predictors of failure after the difference in size, location and industry have been removed.

In order to accomplish these objectives, a group of bankrupt and voluntary liquidated firms from the residential and small commercial builders of the construction industry in a Central Alberta Community was selected. Important financial ratios were computed from the financial data of these unsuccessful firms. A similar group of successful firms was selected and their financial ratios were also computed. The financial ratios of the unsuccessful and successful groups of firms were compared to determine if differences between the ratios of the two groups were noticeable and gave an indication of failure prior to the event. Obviously, by selecting the two groups which were homogeneous from the viewpoint of size, industry and location, a comparison between the ratios of successful and unsuccessful firms would be more meaningful. If significant differences were revealed between the financial ratios of successful and unsuccessful firms, then they could be interpreted to make predictions with regard to the probability of success or failure of a firm in the building industry. Other studies would have to be made for different industry, size of firm, and location before a general statement regarding the predictive power of financial ratios can be made.

A limitation of the study is the lack of uniformity in accounting principles for preparing financial statements. However, each firm selected for this study recorded its inventory on a specific identification basis; their fixed assets were nominal; and their accounts receivable were collected in all cases. Thus, it appears that three important items on the balance sheet would not materially effect the uniformity of the financial statements.

This study has important policy implications if it finds conclusive evidence that business failures can be predicted with the help of financial ratios some time prior to the event. The creditors can reduce their losses substantially by taking appropriate measures on time. In that event, financial ratios can be used as an effective instrument for formulating appropriate credit policies by the creditors.

CHAPTER II

RESEARCH DESIGN

The research design of this study was structured in such a manner as to answer the questions which were proposed in the introductory chapter. The first problem was to determine the degree to which trade suppliers use financial ratios as a tool for analyzing credit risk. The second problem was to examine if financial ratios can safely be considered as predictors of failure after the differences in size, location, and industry have been removed. Thus, it would appear beneficial that operational definitions should be given to some of the basic terms in the study. This is the object of the first part of the chapter. The last part of the chapter will cover the methodology and scope of the study. The procedures used for selecting the unsuccessful and successful firms will be discussed. Also discussed under methodology and scope is the questionnaire which appears in Appendix B of this thesis.

I. DEFINITIONS OF TERMS

Bankruptcy and voluntary liquidation

Under English law there is a distinction between bankruptcy and voluntary liquidation. In a bankruptcy case the proceedings are filed against the corporation by the creditors, whereas in a voluntary liquidation or an insolvency case the corporation files the petition when it

acknowledges its inability to pay its debts as they fall due in regular course of business operations.[1] In Canada the term bankrupt refers to a legal condition, whereas insolvent describes a financial condition.[2] The Canadian meaning of bankrupt as used in the context of Canadian law is as follows:

> . . . a person (corporation) who has done some act or suffered some act to be done in some sequence of which under the laws of this country, he (the corporation) is liable to be proceeded against by his creditors for the seizure and distribution among them of his (the corporation's) entire property.[3]

Bankruptcy legislation, according to Holden and Morawetz, was designed primarily for the following purposes:

> (1) to permit an honest but unfortunate debtor to obtain a discharge from his debt subject to reasonable conditions;
> (2) to provide for the orderly distribution of the property of a bankrupt among his creditors on a pari passu basis;
> (3) to provide an expedious and inexpensive method of compelling an insolvent debtor to turn-over his property to a trustee for rateable distribution among his creditors;
> (4) permit a proper and economical realization of the assets of the debtor;
> (5) to allow investigation to be made into the affairs of the bankrupt.[4]

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[1]Henry Cambell Black, Black's Law Dictionary (St. Paul: West Publishing Co., fourth edition, 1957) p. 186.

[2]J. E. Smyth and D. A. Soberman, The Law and Business Administration in Canada (Toronto: Prentice-Hall of Canada Ltd., 1964), p.548.

[3]Ibid., p. 186.

[4]L. W. Holden and C. H. Morawetz, Bankruptcy Law of Canada (Toronto: The Carsewell Company Limited, 1960), p. 2.

Credit

Beckman defined credit in the following manner:

> . . . the power or ability to obtain goods or services in exchange for a promise to pay for them later. Similarly, it is the power or ability to obtain money, by the borrowing process, in return for a promise to repay the obligations in the future.[5]

The Credit Research Foundation of the National Association of Credit Management defined credit as "the transmittal of economic value now, on faith, in return for an expected equivalent economic value in the future."[6] Thus, it is apparent that in both the definitions futurity is a basic characteristic and when the time element is involved risk is intuitively implied.

Secured creditors

This term refers to a creditor who has prior claim against one or more of the assets held by the debtor. When a secured asset is sold consequent to bankruptcy or voluntary liquidation for a price greater than that owed to the secured creditor, the excess becomes available for settlement of the general claim.[7] However, should the secured asset be sold for less than the secured claim, the secured creditor is ranked

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[5]Theodore N. Beckman, Credits and Collections, Management and Theory (New York: McGraw-Hill Book Company Inc., 1962), p. 3.

[6]Credit Research Foundation, Credit Management Handbook (Homewood, Illinois: Richard D. Irwin, Inc., 1965), p. 6.

[7]Smyth and Soberman, op. cit., p. 433.

with the general claimants for the remainder of the money owed to him.[8]

Unsecured creditors

This term refers to those creditors who have no security other than the promise of the debtor. These claimants divide equally the remainder after all secured creditors have been paid.

II. METHODOLOGY AND SCOPE OF STUDY

Although much had been written about the problems of small business, there appeared to be a lack of empirical studies concerned with the nature of these problems. The available literature emphasized the deficiencies of management and other causes of business failure, but few studies attempted to find means by which a business failure could be predicted prior to the event.

Trade creditors who generally fell within the unsecured creditor classification were the vested losers in bankrupt cases.[9] As mentioned previously this study had attempted to prove, by the use of financial ratios, that business failures could be predicted some years prior to the failure. If failures could be predicted, creditors should be able to reduce their losses resulting from business failures. The study in-

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[8] Ibid., p. 433 - 434.

[9] See Appendix A for losses suffered by the creditors of failed business firms. Comparative figures are supplied for the different years and provinces of Canada.

cluded fourteen bankrupt firms and one voluntary liquidated firm. Of these fifteen firms, there were twelve that had operated for a period of three years or longer and had sufficient financial information available with them for a detailed examination. Of the three firms not analyzed in detail, two had operated for a period of less than two years. It was believed that this short time period would not disclose any trends so their financial data were not analyzed. The remaining firm had insufficient data available for a detailed analysis.

All the failed firms included in the study were incorporated under the laws of Alberta; all the firms were engaged in the residential and small commercial building aspect of the construction industry and operated in a Central Alberta Community. The manager of each of the firms studied was the principle shareholder of the company. From the financial documents of each firm, the necessary data were extracted for ratio analysis, management salary trends, and personal loans received and issued to the firm by the owner/managers.

As a control group twelve firms that were engaged in the same narrow aspect of the construction industry were analyzed. The criteria for selection of firms in the control group was that they were viable as of June, 1969 and conducted their business in the same Central Alberta Community as the failed firms. The following procedure was used in selecting the firms for the control group:
A list of one hundred and ninety-eight general and house-building contractors was prepared and the firms were numbered consecutively. A

random number table was then used to select twelve firms for a primary analysis. If a firm's activities were not comparable to the activities of the failed firms or if the asset size and the sales volume were not in the same range as the failed firms,[10] then another firm was selected by means of the random number table. One of the successful firms that was selected in the original random sample would not cooperate in making financial data available; six firms were rejected after the primary investigation because they did not qualify within the established criteria.

All the successful firms selected for the study were operating for a minimum of three years prior to 1967. The year 1967 was selected as the terminal year of analysis for the successful firms because it was the most recent year that an unsuccessful firm analyzed in this study had failed. Of the unsuccessful firms analyzed, only four firms were in business for a period longer than seven years; one firm was in business for longer than ten years. The successful firms analyzed in this study had all operated less than ten years.

The methodology employed in selecting the control group should eliminate most of the dispersion that would result from external economic conditions, geographic location, and firm size.

Trade creditors and financial intermediaries were interviewed to

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[10] The assets of the failed firms ranged from $40,000 to $300,000 and the sales ranged from $75,000 to $900,000.

determine the type of information they used in establishing a credit criteria for a prospective customer.[11] The questionnaire was pretested on five trade suppliers who were not listed as unsecured creditors of the failed firms. Then twenty-five interviews were conducted with the unsecured trade suppliers who were listed as having lost the largest amount of money because of the business failures. Two financial intermediaries were interviewed to determine the practices which they used as secured creditors in determining their credit criteria. It was noted during the analysis that the list of creditors of the unsuccessful firms and successful firms were nearly identical. The trade suppliers granted an interview and disclosed their credit policy in a cordial manner and with manifest keen interest.

The published financial ratios listed by Dun & Bradstreet were analyzed and discussed with their local office manager. These ratios were compared to the ratios computed from the data gathered on the successful and unsuccessful firms in this study.

Attempts were made to interview the owner/managers of the failed firms, but most of these men refused to grant an interview to discuss the affairs that led up to the failure of their firms.

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[11] A questionnaire was used as a guide during the interview. A copy of this questionnaire appears in Appendix B.

CHAPTER III

REVIEW OF LITERATURE

Much had been written about small business in regard to credit policies, assessment of business performance and financial ratios, but few articles or books had attempted to integrate these interrelated subjects. The purpose of this chapter is to briefly summarize some of the literature that was available in these areas and discuss their relationships. Also, a number of studies conducted to prove or disprove the value of financial ratios as predictors of failure has been summarized.

I. CREDIT POLICIES

The word 'credit' was derived from the latin word credere which meant to believe or to trust.[1] Therefore, trust was implied to credit and this was a mutual trust between the issuer of credit and the recipient. Both parties, the creditor and debtor, stood to benefit by their mutual trust. The creditor increased his sales and the debtor received goods which he might not have been able to purchase otherwise. The two

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[1]Funk & Wagnalls, Standard Dictionary of The English Language International Edition (Chicago: Encyclopaedia Britannica, Inc., 1959) p. 304.

types of credit, which were of interest in this study, were loans from financial intermediaries and interbusiness financing. The latter was defined as the financial assistance that one independent business firm gave another.

A credit transaction then represented the exchange of something for a future promise to pay. This carried with it a certain legal right, but there was no assurance that the business agreement would ever be finalized. Thus, in credit dealings there was always an element of doubt which made it necessary for those who issued the credit to evaluate as accurately as possible the probability of payment and the timing of the payment.

The literature reviewed indicated a dichotomy between the two sources of credit, loans from financial intermediaries and interbusiness financing. The financial intermediaries generally insisted on and maintained a secured creditor policy. Their loans were secured by either one or a combination of mortgages on fixed assets, personal pledges or an endorsement by a firm which appeared more financially sound. The risk associated with this type of transaction was generally small. Figures released by the Dominion Bureau of Statistics revealed that losses from loans by financial intermediaries were relatively infrequent and were mostly of small amounts.[2]

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[2]Dominion Bureau of Statistics, Canada Year Book 1967 (Ottawa: Queen's Printer and Controller of Stationery, 1967), p. 938.

The statistics were considerably different for those firms which used interbusiness financing. This form of financing covered a wide variety of open-book unsecured trade agreements, varying in both time and cost. Issuing of credit was listed as primarily a sales and competitive device. Therefore, it appeared unrealistic to maintain a standard form for issuing credit as the form would probably change as often as the competitive situation.[3] This type of competition and uncertainty stimulated a flexible credit policy.

Hungate listed a number of reasons why a business firm would concern itself with issuing credit. The primary reasons listed were: (1) to attract new customers, (2) to remain competitive in the same marketing field, and (3) to assist customers in expanding their business which might mean a long period of increased sales to that firm.[4] Undoubtedly, the creditors realized that anytime money was due in the future, there was a cost involved[5] and the firm which issued the credit should be compensated for this cost. This compensation could be hidden in the mark-up of the goods, that is, goods that were generally sold on

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[3]Robert P. Hungate, Interbusiness Financing: Economic Implications for Small Business (Washington, D. C.: Small Business Administration, 1962), p. 3 - 5.

[4]Ibid., p. 5.

[5]There are various factors that require a premium be paid to the lender. No attempt is made to distinguish among risk, inflation, time preference or the record keeping cost involved.

credit would be sold at a higher price than if they were sold on a cash basis. Also incentives for early payment were frequently offered to the purchaser.[6] The problem remained, however, that many of these accounts extended beyond their due date. Hungate also stated that in most cases the cost of extended interbusiness financing was unknown to both the borrower and lender.[7]

Many authors[8] writing in the area of small business maintained that credit was often too easily obtained by a new small business firm. They emphasized that liberal credit policies created a temptation to over purchase and over expand before management was properly prepared. Over expansion was listed as one of the most common causes for failure of new business enterprises. The issue at point is how does a creditor determine the risks and opportunities involved when extending credit to a client?

To maximize profits, merchandise should be sold on credit until the marginal cost of issuing credit equalled the marginal profit on

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[6]A common discount offered as incentive for early payments is 2/10 net 30. The 2 indicates the discount offered; the 10 indicates the number of days that the discount is in effect. A discount of this dimension is approximately 36% interest per annum.

[7]Hungate, op. cit., p. 50.

[8]Ronald Grunewald, Small Business Management (Dobbs Ferry, New York: Oceana Publications, Inc., 1966), pp. 81 - 90; W. Grant Ross (ed.), Management Aids for The Smaller Company (Toronto: The Canadian Institute of Chartered Accountants, 1962), pp. 10 - 19; Hungate, op. cit., pp. 11 - 65; Credit Research Foundation (ed.) Credit Management Handbook (Homewood, Illinois: Richard D. Irwin, Inc., 1965), pp. 127 - 179.

credit sales. The decision, which must be made, was less than certain. However, when the marginal cost of issuing credit was being calculated, it must be remembered that there was a profit built into the account written-off, as well as an allocation of fixed expenses which were incurred regardless of the sale.[9] This indicated that products with a higher mark-up and a larger contribution to overhead should be sold to higher credit risks than those products with a lower contribution to profits and overhead. This created some difficulties as pointed out by Kaplan, when one product could be sold on credit to a certain customer, but another product with a lower mark-up and contribution to overhead could not be sold.

The problems mentioned were considerably different when viewed from a secured creditor position as opposed to an unsecured creditor position. The secured creditor like the unsecured creditor was primarily concerned with receiving payment on his account, but the secured creditor was also concerned that the debtor accumulated equity in the secured asset at a more rapid rate than the value of the asset decreased in the market. The unsecured creditor, however, must calculate the probabilities of receiving his payment or attempt to determine the amount he would receive from the total value of assets which would result from a forced sale of assets in the case of liquidation. What was required was some

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[9]Robert M. Kaplan, "Credit Risk and Opportunities" Harvard Business Review, March, 1967, pp. 83 - 88.

measuring device which would accurately measure these probabilities. The other alternative was to have an accurate screening system which could segregate those firms which were highly unlikely to make payment from those which were a good credit risk.

An organization's efficiency and effectiveness determined whether that organization remained viable or became listed with the other unsuccessful firms. This concept of organizational efficiency and effectiveness was the problem of contention.

II. ORGANIZATIONAL EFFICIENCY AND EFFECTIVENESS

The traditional theory of the firm assumed that four basic inputs were required for a firm to remain operational: resources, labour, capital, and the entrepreneur. This theory assumed that the entrepreneur attempted to maximize his return.[1] The theory also maintained that the entrepreneur would act rationally and select the best alternative for reaching his goal which was profit maximization.[2] In a small organization, the managerial hierarchy generally consisted of an entrepreneur and his small staff. In such cases the goals of the organization and the entrepreneur were postulated as synonomous and conformity to these

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[1]Joseph W. McGuire, Theories of Business Behavior (Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1964), p. 19.

[2]Richard N. Cyert and James G. March, A Behavioral Theory of the Firm (Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1963) pp. 26-43.

goals were purchased (by rewards and sanctions) and supposedly, conflict would be non-existent.[3] Cyert and March took an opposite viewpoint when they argued that,

> . . . the goals of a business firm are a series of more or less independent (aspiration level) constraints imposed on the organization through a process of bargaining among potential coalition members and elaborated over time in response to short run pressures.[4]

Thus, these authors argued that organizational goals were a result of the interplay of a number of goal seeking forces within the organizational framework. This differed from the traditional model because the firm was "a coalition of participants with disparate demands, changing foci of attention, and limited ability to attend to organizational problems simultaneously".[5] As stated earlier the traditional theory assumed that the entrepreneur had control of his firm and trade-offs within a coalition were non-existent.

Viewing the organization in the perspective of Cyert and March, there always appeared to be a multiplicity of goals operational in an organization. Thus, conflict would seem to be inevitable and never completely resolved. The individual in this concept was always in a potential bargaining state with the coalition and could act either rationally or irrationally when compromising with other members of the

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[3]Ibid., pp. 27 - 28.

[4]Ibid., p. 43.

[5]Ibid., p. 43.

coalition in a goal conflict situation.

The belief that the firm, because of the profit maximization goal, could be evaluated for effectiveness and efficiency in the market might not be absolutely true. Some firms, as previously argued, might not have profit maximization as their goal, but derived more satisfaction from some other less tangible goals. This being the case, how did one determine the effectiveness and efficiency of an organization? Assuming every firm must maintain some degree of profitability if it was to remain viable, the problem remained to be solved was which firms could maintain that degree of profitability to remain viable?

Efficiency was defined by Katz and Kahn as the ratio of energic input to energic output.[6] The problem, which appeared to remain unsolved, was how did one proceed to identify and measure the inputs and outputs of a firm. However, the authors maintained that this problem was concerned with the frame of reference the observer desired and would vary depending on the need in question.[7] Katz and Kahn also emphasized that efficiency and effectiveness should be evaluated within the framework of both actual and potential.[8] It must be emphasized that these authors were studying the problem within the theoretical context.

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[6]Daniel Katz and Robert L. Kahn, The Social Psychology of Organizations (New York: John Wiley & Sons, Inc., 1966), p. 151.

[7]Ibid., p. 153.

[8]Ibid., p. 155.

No attempts appeared to be made to operationalize these theories. Both the potential and actual efficiency of a firm changed over time. Actual efficiency could be defined as a measurement of past and present results. Potential efficiency could be defined as a projection into the future as well as a basis for assessing past results if different decisions had been made. Efficiency, if defined as a ratio of inputs to outputs, was a measure of both inter and intra economic and technical aspects of an organization.

It would appear reasonable to assume that an organization could remain viable if it disposed of its output for a greater exchange than it required for its input. Some organizations reached a low point of efficiency where the external environment or external members of the coalition would no longer supply the inputs required for the organization's transformation process. At this point the organization could not remain in operation.

Why did several thousand business firms in Canada[9] disappear each year? Some of the business firms disappeared because of mergers and take-overs; other business enterprises might have ceased operations as a result of not accomplishing the task or goal for which they were intentionally designed. The firms, which terminated operations for these reasons, generally created no great loss to the economy because

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[9]Dominion Bureau of Statistics, op. cit., p. 939.

of the planned dissolvement. However, there were a large number of firms which ceased operations under conditions of bankruptcy and voluntary liquidation (see Appendix A). These firms were unable to operate efficiently and as a result, often terminated business only after leaving large amounts of debt to be absorbed by other firms. As mentioned in the previous chapter, the single factor listed most often as the reason for this inefficiency was weakness in management. Management as defined by Peter Drucker was the ability to attain goals of business performance and business results.[10]

How did one, especially a creditor, determine whether or not a manager, and in the case of most small businesses the manager/owner, was going to maintain an efficient operation? It would seem highly unlikely that managers would subject themselves to intelligence and aptitude tests which creditors might wish to administer in an attempt to determine the managerial potential of each prospective debtor. Probably, the interview technique was the best alternative. However, unless the interviewer was properly trained the results might be improperly interpreted. A more tangible means of analysis, which had been used for years, is financial ratio analysis.

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[10] Peter Drucker, The Practice of Management (New York: Harper & Row, Publishers, 1954), pp. 6 - 16.

III. FINANCIAL RATIO ANALYSIS STUDIES

In a broad sense, the term "ratio" meant a numerical relationship expressing one figure in terms of another. The term "financial ratio analysis" referred to the process of computing and presenting the relationships of items or groups of items which appeared on financial statements such as the balance sheet, income statement and funds flow statement. These ratios were analyzed for the purpose of revealing favorable or unfavorable conditions or trends.

The utility of financial ratios as being able to predict financial difficulties of a business firm had always been questioned. Empirical studies conducted into the usefulness of financial ratios as means of predicting failure did not reveal any persuasive results and the reliability of financial ratios in predicting failure remained very much in question. The studies which had been conducted could be classified into three areas.

First there was a group of studies concerned with the most serious form of financial difficulties, business failure.[11] These were

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[11]Raymond F. Smith and Arthur H. Winakor, Changes in Financial Structure of Unsuccessful Industrial Corporations, Bulletin No. 51 (University of Illinois: Bureau of Business Research, 1935); Paul J. Fitzpatrick, A Comparison of the Ratios of Successful Industrial Enterprises with Those of Failed Companies (Washington: The Accountants

the studies which would be emphasized as they were of greatest concern to this thesis. A second group of studies dealt with a somewhat less severe aspect of financial difficulties, namely, default of long-term loans and corporate bond issues.[12] Hickman concluded from his study in this area that the net profit to sales ratio and the times-interest-earned ratio predicted default on bond issues in the majority of cases. Those firms with the lower ratio defaulted more frequently than those with higher ratios. However, Hickman was not able to determine where along the ratio continuum was the default/no default demarcation.[13] Jen, in his study, found that such ratios as net profit to total assets and total debt to total assets were more significant in determining the availability of bank credit than the more common risk ratios.[14]

Publishing Company, 1932) William H. Beaver, "Financial Ratios As Predictors of Failure" Journal of Accounting Research, 1967, pp. 71-111; _____"Alternative Accounting Measures as Predictors of Failure" The Accounting Review, January 1968, pp. 113 - 122; James O. Harrigon, Some Empirical Bases of Financial Ratio Analysis", The Accounting Review, July 1965, pp. 558 - 568.

[12]W. Braddrock Hickman, Corporate Bond Quality and Investor Experience (Princeton: Princeton University Press, 1958); Raymond J. Saulnice, Harold G. Halcrow, and Neil H. Jacoby, Federal Lending and Loan Insurance (Princeton: Princeton University Press, 1958); A.H. Winakor, Standard Financial Ratios for the Public Utility Industry, Bulletin No. 26 (University of Illinois: Bureau of Business Research, 1929); Frank Chifing Jen, "The Determinants of the Degree of Insufficiency of Bank Credit to Small Business", Journal of Finance, December 1963 pp. 694 - 695.

[13]Hickman, op. cit.

[14]Jen, op. cit.

A third group of studies was concerned primarily with indicators that would reveal developing financial problems, such as lack of profit. In these studies, the researchers attempted to segregate profitable firms from unprofitable firms by the use of financial ratios. This group of studies appeared to indicate that financial ratios could be useful in segregating the highly profitable firms from the unprofitable firms, but there were problems in segregating the marginally profitable firms from the unprofitable firms.

Smith and Winakor's study in the early 1930's appeared to be the earliest attempt at testing the usefulness of financial ratios as a means of predicting failure.[15] These researchers studied 183 firms that had failed prior to 1931. Smith and Winakor employed twenty-one ratios to analyze the financial statements of each firm for the last ten years prior to failure. They concluded from this study that long-term ratios were good indicators of failure. However, they recommended the net working capital to total asset ratio as the most consistent indicator that a firm was beginning a period of financial difficulties. This study lacked a control group as no successful firms were analyzed to show that the successful firms never suffered from the same trends as the unsuccessful firms.

Fitzpatrick also conducted a study during the same period.[16]

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[15]Smith and Winakor, op. cit.

[16]Fitzpatrick, op. cit.

Fitzpatrick's methodology employed a control group against which the findings of the unsuccessful firms were compared. This study analyzed twenty unsuccessful firms for periods of three to five years prior to failure. His control group consisted of nineteen selected successful firms which were comparable with the unsuccessful firms as to asset size and sales volume but were not operating in the same geographic location. The conclusions of this study also attributed some usefulness to financial ratios as indicators of failure.

Beaver, in a more recent study, attempted to determine if financial ratios could predict failure with a higher degree of accuracy than a random prediction.[17] Beaver's methodology consisted of selecting seventy-nine firms that had failed during the ten year period ending 1964. For each failed firm, he selected a successful firm with the same sales and asset characteristics. Finally, he conducted a comparison of means, a dichotomous classification test and an analysis of likelihood ratios.

Beaver concluded by stating that ratio analysis might provide a useful information, but he also cautioned that:

> . . . ratios must be used with discretion: (1) not all ratios predict equally well. The cash flow to total debt ratio has excellent discriminatory power throughout the five year period. However, the predictive power of the liquid asset ratios is much weaker. (2) The ratios do not predict failed and non-failed firms with the same degree of success. Non-failed

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[17]Beaver, op. cit.

> firms can be correctly classified to a greater extent than can failed firms.[18]

From these findings, one might conclude that creditors could not, by the use of financial ratios, completely remove the possibility of investing in a firm that had a probability of failing. However, there was sufficient evidence in this study that indicated some usefulness in financial ratio analysis as a means of predicting failure at least five years prior to failure.

Altman[19] conducted another study with the hope of bringing ratio analysis as an analytical tool into a more respectable position in both the academic and business community. Altman employed a multiple discriminant statistical method to analyze sixty-six heterogeneous firms. Thirty-three of the firms studied in the sample had declared bankruptcy in the twenty year period ended 1965; the other thirty-three firms studied were selected as a control group. The theory, which stimulated this type of analysis, was that a multivariate framework would have more statistical significance than sequential ratio comparisons. This assumption appeared to be correct as bankruptcies were predicted correctly in ninety-four percent of the cases.[20] This type of analysis might

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[18]Ibid., pp. 101 - 102.

[19]Edward I. Altman, "Financial Ratios, Discriminant Analysis And The Prediction of Corporate Bankruptcy", The Journal of Finance, September 1968, pp. 589 - 609.

[20]Ibid., p. 609.

be appropriate for large corporations which employed statisticians and mathematicians, but it might not be feasible for the small firms which were primarily run by the entrepreneur and his small staff.

As concluded from these studies, financial ratios did not appear to be a completely safe method of predicting business failures. Like most other analytical techniques they should be used with judgment. The main criticism of the studies reviewed was that the samples used were heterogeneous as to asset size, industry, and economic environment. A more homogeneous group might have significantly changed the conclusions.

IV. THEORY OF FINANCIAL RATIOS

Financial ratios were primarily designed as guideposts that could be used when confronted with a maze of financial data.[21] The theory implied that if a firm's ratios were similar to the ratios of other firms in the same industry, management and creditors of the firm could have confidence in the firm remaining viable. If the ratios were dissimilar then a search for some underlying cause would be the appropriate action to take. The theory did not maintain that financial ratios would disclose all problems, but they might serve to highlight some irregularities which developed.

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[21] William J. Brown, "Business Ratios", Textile World, November 1964, pp. 84 - 86.

Certain assumptions were made when using financial ratios as a means of analysis. These assumptions were: (1) the financial statements revealed the true financial position and operating results of the business, (2) there were standard ratios for each type of business for a given time period and geographical location, (3) no ratio was meaningful unless it was compared with a standard, generally recognized as serving the purpose satisfactorily.[22] These assumptions implied that when a ratio analysis was employed, the analyst must be cognizant of the statement dates, location of the firm, and the industry standards to which the ratios were compared.

The fact remained, however, that accounting data revealed the past and the question was whether past data could aid in predicting future events? Decision making theory suggested that the reliability placed on past data in predicting the future was inversely proportional to the stability of the past and uncertainty of the future. Thus, when the past had been unstable and the future appeared uncertain, managerial judgment and analytical tools other than financial ratios were required.

There were many limitations to ratio analysis; the most obvious was different accounting principles that could be adhered to when compiling financial statements. This difference could be significant even between firms in the same industry and location. It must be realized

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[22]Theodore N. Beckman, Credit and Collections, Management and Theory (New York: McGraw-Hill Book Company, 1962), pp. 419 - 421.

that the balance sheet figures might not represent the value of the firm as a going concern or the value which could be realized upon liquidation. The figures, which generally revealed the true amounts, were the current liabilities and long-term liabilities. This might bias the financial statements toward the creditors and place them in a more sound position than otherwise revealed.

Financial ratios were meaningful only if a meaningful relationship existed between the figures selected for comparison. Financial ratios were an analytical tool and as such they must be used correctly.

CHAPTER IV

ANALYSIS OF CREDIT POLICIES

Trade suppliers for the building industry were interviewed to establish what information they requested from their prospective customers before issuing credit. The first part of this chapter presents the findings with regard to the general credit policies of trade suppliers. The second part establishes the number of trade suppliers who utilized the financial data of prospective credit customers in determining their credit policies. The third part of the chapter discusses the findings with regard to the utilization of financial ratios by trade suppliers. In the last section of this chapter, the secured creditors are discussed with regard to their credit policies and the information they used in establishing these policies.

The questionnaire, that was used as a guide during the interviews and the responses to the questions, appears in Appendix B. The questionnaire was of an open-end nature. Each question was discussed with the participant so as to obtain more information and to clarify any ambiguous question. Many of the respondents volunteered more information than formally requested. Twenty-five interviews were conducted with the trade suppliers listed as unsecured creditors of the bankrupt firms. The questionnaire was also pretested with five trade supply creditors who did not appear on the list of the unsecured creditors of the bankrupt firms.

I. GENERAL CREDIT POLICIES OF TRADE SUPPLIERS

It was found that only the larger suppliers had an established credit department. In the smaller firms either the president or the controller acted as credit manager. The response of the creditors, (Question 1, Appendix B) revealed that most trade suppliers had a general credit policy which they used as a guideline while dealing with unsecured creditors. However, it was pointed out by the trade suppliers that this credit policy was very flexible and each case was assessed on its own merits. Most firms had stipulated the maximum amount of credit that could be issued to a new customer. After a customer established a credit rating with the firm, then he was given special consideration. All trade suppliers claimed that they investigated each new customer thoroughly before extending the credit privilege. This, they emphasized, was adhering to the general principles of credit which required knowing their customers, their legitimate needs, and their means.

Only three of the creditors surveyed maintained and followed the policy that products with a higher gross profit margin than products with a lower contribution to overhead and profits should be sold to higher credit risk customers. They admitted that it was difficult to explain to a customer that he could purchase certain products on credit and would have to pay cash for other products. Most trade suppliers stated that a customer either warranted credit or did not warrant credit. The marginal

cases should be judged on customer and not on product.

Most creditors (Question 6, Appendix B) followed the policy of conducting personal interviews with the creditee. By means of the interview, the trade suppliers attempted to determine the long and short range goals of the debtor. This would give an indication of the amount of planning done by the prospective customer. It was agreed among the creditors that firms which had definite plans regarding their future operations were a better credit risk than those firms which had no plans. The personal interview also provided an opportnity for the creditors to inquire into the customers educational background and training. Ninety percent of the trade suppliers interviewed (Question 12, Appendix B) thought that education and training was the most important attribute of management for success in the building industry. The education referred to here was the technical as opposed to the theoretical knowledge. They thought cost accounting to be the most important academic course.

The personality of the owner/manager of the firm asking for credit was listed as the second most important attribute of a successful manager. Confidence and neatness in appearance were other traits of personality thought to be highly desirable. Ability to organize was another desirable trait, but most creditors admitted it was a quality difficult to assess over a short period of time. Persistence and optimism were ranked lower in importance than those previously listed.

II. UTILIZATION OF FINANCIAL DATA

This section of the chapter discusses those questions in Appendix B which were designed to determine the emphasis creditors placed on the financial data of their customers. Management and financial condition of a firm were thought to be the first and the second most important factors to consider when determining credit risk, (Question 11, Appendix B). The debt payment record of the firm was listed, with few exceptions, as the third most important factor. Profitability of the firmwas ranked as the fourth important factor. The rating of credit assessors, such as Dun & Bradstreet, was ranked as the least important among the choices listed on the questionnaire.

Respondents were asked to indicate the degree they used Dun & Bradstreet, Canadian Credit Mans Association, or banks as a source of credit information. Most respondents (Question 18, Appendix B) cited one of the three listed above as a source of credit information on small business. There was no indication given as to which was preferred. It was emphasized by the trade suppliers that credit reports of this nature were never conclusive. Without being specific about the names of organizations, there was frequent mention of various credit associations which were formed by the local credit managers for the purpose of disseminating information regarding the credit rating of building contractors in the local area.

Most firms ordinarily requested financial statements from the firms to which they issued credit. However, a number of firms stated that when they ordinarily requested financial statements from their credit customers these statements were not submitted (Question 10, Appendix B). The creditors specified that competition was the main reason for which they were refused the submission of financial statements. The building contractors who would not submit financial statements to the trade suppliers were issued credit based on past payment records, local credit bureau's credit rating, or general trends of the company's operations.

It was also found that few of the smaller building contractors had their books audited; thus the statements had a doubtful value. The desire of the creditors for obtaining reliable financial statements from a creditee was confirmed by the large percentage of affirmative answers when they were asked if all firms, regardless of size, should have an annual audit by a chartered accountant (Question 24, Appendix B). Generally it was regarded that inventory, accounts receivable, and trade liabilities were often misrepresented on unaudited statements and these were specified as three important items for analyzing financial statements. Trade suppliers realized that if they joined together and set a policy that financial data must be submitted before credit of a continuous nature was made available, then this problem of acquiring financial statements would be alleviated. Commercial banks and the Industrial Development Bank confirmed that they would not even consider

issuing a fully secured credit without receiving the financial statements of a prospective customer. The trade creditors agreed that such a demand from customers was unlikely in the near future because of their inability to organize and the competition in the industry. Some respondents also stated that they would welcome the power like banks and other financial institutions to stipulate the maximum salaries and loans the owner/manager could receive from his firm while the credit agreement was in effect.

III. UTILIZATION OF FINANCIAL RATIOS

The primary purpose of the questionnaire was to determine the number of creditors who used financial ratio analysis and the value, if any, they placed on financial ratios. Eighty-five percent of the firms surveyed stated that financial ratios were a valuable tool to use in determining the solvency and the profitability of a firm. The remaining creditors appeared indifferent to the use of financial ratio analysis (Question 20, Appendix B).

Most trade suppliers infrequently used ratios computed by such firms as Dun & Bradstreet for the purpose of comparison (Question 12, Appendix B). Large trade supply firms used ratios more than small trade suppliers. The creditors thought that the industry averages calculated from firms across Canada were of no value for comparative purposes. It was emphasized that the financial ratios published by Dun & Bradstreet

were computed from the financial statements of 6,771 building contractors from all parts of the country.[1] These firms varied in size from the largest to the smallest with respect to asset value and sales volume. They also represented different local economic conditions across Canada and were composed of small and large volume residential contractors and high-rise apartment builders. It was also indicated that for various reasons small business customers should not be required to conform to any rigid and theoretically conceived standards concerning financial ratios.

No ratio received unanimous approval as the best ratio to be used while assessing credit risk (Question 22, Appendix B). In a number of cases, the creditors gave more importance to such factors as working capital, net worth, and net profit than financial ratios for analyzing the credit risk of their customers. The two ratios most frequently mentioned by the creditors for assessing the risk were current assets to current liabilities and total debt to tangible net worth. The ratio of accounts receivable plus cash to current liabilities were also frequently mentioned as an indicator of risk. Along with the ratio of accounts receivable plus cash to current liabilities, the creditors used the average collection period of accounts receivable. The creditors appeared to realize that it was their customers' accounts receivable that was used to pay his current liabilities. Thus, if the building

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[1]Dun & Bradstreet, Key Business Ratios in Canada, Toronto: Dun & Bradstreet of Canada, Ltd., 1968.

contractors collected their accounts receivable in ninety days, it was expected that their accounts payable would be paid in ninety days. Surprisingly, no creditors appeared interested in a customer's inventory turnover rate. However, they did realize that it was their building materials which were used to construct the creditee's inventory before it could be sold and become an account receivable. Therefore, the creditors appeared to forget an important item in the cycle, namely the time period for which inventory was in process. The rationalization presented by the creditors for omitting the inventory turnover rate was the advance payments by mortgage companies. It was often stated by the creditors that the payment holdbacks by the mortgage companies to cover contingencies, warranties, and non-compliance of contract by the building contractor was used by the creditee as an excuse for late payment of the credit.

Approximately one third of the trade suppliers interviewed revealed that they calculated a limited number of financial ratios and kept them on record for comparison with other firms of the same size and industry (Question 23, Appendix B). They indicated that these ratios were more meaningful to them than the arithmetic mean of ratios for all firms across Canada.

IV. SECURED CREDITORS

A survey of secured creditors revealed that they used ratio analysis even though their loans were fully secured by mortgages on fixed

assets, personal pledges, or co-signed by some guarantor. These creditors emphasized that they were primarily concerned with receiving payment on their loan and not in possessing an asset on which they had a lien. Thus, these creditors expressed their primary interest in the present and potential earnings of a firm. The debt equity ratio was considered as the second most important factor by the creditors.

The secured creditors frequently stipulated conditions in the loan agreement to minimize the risk of payment of the loan by the creditee. These stipulations often related to management salaries, personal loans to the owner, and the submission of financial statements when requested by the lending firm. It appeared that secured creditors had no problem in obtaining financial statements from their customers.

V. SUMMARY

Most of the trade suppliers interviewed used ratio analysis to some extent, although much of the use of ratio analysis appeared to be informal. There seemed to be, even within the limited range of the size of the trade supply firms sampled, a decided pattern of use and understanding of financial statements, particularly financial ratios. The larger creditors used ratios more frequently and understood them better than the smaller creditors. The manager of one small trade supply firm asked about the meaning of financial ratio analysis and how these ratios were calculated. This firm used the paying habits of the customers and the character of the owner/managers when deciding to issue credit. The

larger firms indicated that they would use ratio analysis more if the customers would be cooperative in submitting their financial statements.

The most commonly used ratios were those of current assets to current liabilities and total debt to tangible net worth. Ratios of lesser importance were accounts receivable plus cash to current liabilities and the turnover of accounts receivable. The inventory turnover ratio received no mention from the creditors interviewed. Return on investment as measured by net profit to tangible net worth was used by only a small number of the larger trade suppliers.

Published ratios appeared to be used only as a rough guide for comparative purposes. A small number of firms interviewed used their computed ratios to compare against firms of similar size and industry. This was clearly a function of size; the smaller creditors used ratio comparison less frequently than the larger creditors. Most of the small firms relied heavily on the payment habits of their customer.

An analysis of the list of secured and unsecured creditors of the bankrupt firms revealed a noticeable difference in the payments received after bankruptcy. In only one case, the secured creditors received less than full payment on their loan. The unsecured creditors, in all cases, incurred substantial losses which indicated that their means of establishing credit ratings of customers could be improved.

CHAPTER V

RATIO ANALYSIS

This chapter presents the analysis of the financial data that was collected for the successful and unsuccessful firms in the building industry. First, a list of the ratios used in the analysis is presented. Second, an explanation is given as to how these individual firm ratios were accumulated into meaningful statistical data that could be presented to show the similarities and differences between the successful and unsuccessful firms. Last, any similarities and differences between the successful and unsuccessful firms are shown with the help of tables.

I. FINANCIAL RATIOS USED IN THE STUDY

Broadly speaking, the fourteen ratios employed in this chapter for analyzing the financial data were categorized into two groups, risk or liquidity ratios and profitability ratios. The risk category was further subdivided from the viewpoint of short-term and long-term risk. The profitability category was classified into the profit margin and asset turnover groups for the analysis. Within each of the two broad categories, the following ratios were included as the basis for the study:

1. Risk ratios
    A. Short-term risk ratios

1. Current assets to current liabilities[1]

2. Current Assets less inventory to current liabilities[2]

B. Long-term risk ratios

1. Net fixed assets to tangible net worth[3]

2. Total debt to tangible net worth

3. Current debt to tangible net worth

4. Shareholder's equity to tangible assets

II. Profitability ratios

A. Profit margin ratios

1. Net operating profit to sales

2. Net profit to sales

3. Net profit to tangible net worth

B. Asset turnover ratios

1. Sales to working capital

2. Sales to inventory

3. Accounts receivable collect period in days

4. Sales to tangible assets

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[1]This ratio is commonly referred to as "the current ratio".

[2]This ratio is often referred to as the "quick ratio".

[3]Tangible net worth is the equity of stockholders in the business, as obtained by common stock plus retained earnings (less deficit) and then deducting intangible assets.

II. METHODS OF COMPARISON

Rejection limits were established to exclude ratios which arose from an abnormal situation. Under certain conditions, some ratios, especially the asset turnover ratios, did not always indicate the level of activity of a firm. An example of this was the sales to working capital ratio as the firm's working capital approaches zero. Any ratio that did not provide a measure of a firm's activity was rejected from all calculations. Also negative numbers resulting from debit balance in owner's equity and negative working capital were rejected when the asset turnover ratios were computed.

The arithmetic mean, standard deviation, skewness, high ratio, low ratio, and Kendall's tau rank correlation were computed for each ratio. These calculations were made for each year for the successful firms and each year for the unsuccessful firms. All results with regard to the above calculations are presented in tabular form later in the chapter when they are discussed.

The nature of the distribution exhibited by the different financial ratios was a fundamental question which was frequently omitted from the published ratios which were suggested as guide lines by the different industries. Published financial ratios by such firms as Dun & Bradstreet provided the arithmetic mean for a number of important

ratios, but they did not show dispersion and its skewness. A number of factors, such as industry classification, size of firm, geographic location, which were expected to increase the dispersion of financial ratios could be discounted in this study because of the homogeneity of both the successful and unsuccessful firms with regard to these factors. Accounting principles might have contributed to the dispersion of the ratios, but in most cases assets that were subject to a variety of accounting principles accounted for a small amount of the total assets. Inventory was primarily composed of goods in process which were valued at the cost incurred to date on each item in inventory.

Kendall's coefficient of rank correlation, tau, was used because it is a measure of the relationship between pairs of rank-order numbers.[4] Lordahl described tau as follows:

> Tau is based on a probability analysis of the possible orders in which elements in a set of rankings may be placed, and the probability of two elements reversing their relative positions on two different rank-order scales.[5]

Kendall's tau, with reference to the statistical data of this study, ranked the specific ratios of the unsuccessful firms for a particular year against the same ratios of the successful firms for the same year. Kendall's coefficient indicated the number of inversions in one ranking

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[4]Daniel S. Lordahl, Modern Statistics for Behavioral Science (New York: The Ronald Press Company, 1967), p. 288.

[5]Ibid., 289.

as compared to another.[6] The term inversion used in this context refers to two elements in inverse order as compared with a given standard order.[7] The given standard order of this study was that all unsuccessful firms would have lower short-term risk ratios and profit margin ratios, but higher long-term risk ratios and asset turnover ratios than the successful firms. Tau has a range of minus one to plus one; plus is the perfect normal ranking.[8]

III. RISK RATIOS

Short-term Risk Ratios

There appeared to be significant differences in the current ratios of the successful and unsuccessful firms up to the year just prior to the year of failure of the unsuccessful firms. TABLE I-A showed that there was a pronounced decline in the liquid position of all the unsuccessful firms in year 1. Year 1 in the tables of this chapter referred to the year prior to failure of all the unsuccessful firms; year 2 referred to the second year prior to failure. Thus, year 1 could be the 1967 fiscal year for some failed firm and the fiscal

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[6]John I. Griffin, Statistics Methods and Applications (New York Holt, Rinehart and Winston, 1962), p. 273.

[7]Ibid., p. 273

[8]Lordahl, op. cit., p. 290.

TABLE I-A

SHORT-TERM RISK RATIOS FOR SUCCESSFUL AND UNSUCCESSFUL FIRMS

	SUCCESSFUL		UNSUCCESSFUL	
	current ratio	quick ratio	current ratio	quick ratio
Year 1				
mean	1.315	0.896	0.648	0.247
SD*	0.356	0.507	0.254	0.182
skewness	.974	0.416	- .106	0.191
high	2.039	1.901	1.042	0.567
low	.911	0.154	0.238	0.022
num.**	12	12	12	12
Year 2				
mean	1.281	0.813	1.006	0.351
SD	0.703	0.515	0.226	0.246
skewness	1.022	0.827	0.507	0.671
high	2.987	1.821	1.407	0.885
low	0.217	0.165	0.670	0.052
num	12	12	12	12
Year 3				
mean	1.292	0.765	1.159	0.516
SD	0.540	0.557	0.259	0.315
skewness	-0.883	0.507	0.877	0.206
high	1.861	1.810	1.731	1.090
low	0.039	0.039	0.832	0.009
num	12	12	11	11
Year 4				
mean	1.240	0.388	1.170	0.673
SD	0.818	0.336	0.356	0.457
skewness	0.813	1.341	- .555	-0.171
high	2.968	1.161	1.661	1.190
low	0.086	0.038	0.581	0.056
num	9	9	9	9
Year 5				
mean	1.136	0.639	1.140	0.580
SD	0.650	0.408	0.483	0.463
skewness	0.885	0.265	0.240	0.519
high	2.540	1.149	1.838	1.323
low	0.256	0.153	0.502	0.072
num	9	9	6	6

* standard deviation

** Number of firms included in the calculations

SOURCE: Financial statements of 12 successful and 12 unsuccessful firms in the construction industry in a Central Alberta Community.

year 1963 for another failed firm, depending on the year it failed. As previously mentioned all bankrupt and voluntarily liquidated cases studied occurred between the years 1963 to 1967. Year 1 in the tables referred to the 1967 fiscal year for all successful firms analyzed in this study. The year numbers progressed backwards.

With reference to TABLE I-B, Kendall's tau indicated a definite ranking of the current ratios of the successful and unsuccessful firms. A detailed analysis of the current ratios pointed out that only one unsuccessful firm had a current ratio higher than the lowest current ratio of all the successful firms. Thus, with reference to TABLE I-A, it would appear that any firm engaged in the residential and small commercial building aspect of the construction industry that had a current ratio between 1.042 and 0.911 might be operating on the margin between success and failure. Trade suppliers should be extra cautious when asked to issue credit to firms with a current ratio between 0.911 and 1.042. This also indicated that suppliers should deal on a cash basis with firms that displayed a current ratio of less than 0.911.

Both TABLE I-A and TABLE I-B would show that there was no meaningful difference between the current ratios of the successful and unsuccessful firms prior to year 1. TABLE I-A would also show that the dispersion of the current ratio was smaller among the unsuccessful firms than among the successful firms; this was true for each year analyzed. The 1968 current ratio published by Dun & Bradstreet for "Building

TABLE I-B

KENDALL'S TAU FOR SHORT-TERM RISK RATIOS

Year	Current ratio	Quick ratio
1	.958	.805
2	.305	.611
3	.287	.227
4	-.185	-.333
5	.000	.071

SOURCE: Financial statements of 12 successful and 12 unsuccessful firms in the construction industry in a Central Alberta Community.

Contractors" was 1.16.[9]

The quick ratio revealed a downward trend three years prior to failure. TABLE I-A and TABLE I-B would show this trend to become progressively more pronounced in years 2 and 1. However, the standard deviation of the quick ratio for the failed firms was considerably smaller than that of the successful firms. This made it difficult to differentiate a firm that was about to fail from a marginally successful firm on the basis of the quick ratio. Kendall's tau also indicated that the ranking of the quick ratios was not as normal as that of the current ratio. This would appear correct as TABLE I-A showed the highest quick ratio among the unsuccessful firms as 0.567, whereas the lowest quick ratio among the successful firms was 0.154.

Long-term Risk Ratios

This group of ratios appeared to give an indication that a firm was beginning a period of financial difficulties at approximately the same time as the short-term risk ratios. No meaningful differences appeared in the long-term risk ratios between the two groups of firms until two years prior to failure at which time a significant difference occurred in the mean and standard deviation of these ratios (see TABLE II-A and TABLE II-B). Kendall's tau (TABLE II-C) revealed no significant difference in the ranking of the four ratios in this category until the

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[9]Dun & Bradstreet, Key Business Ratios in Canada (Toronto: Dun & Bradstreet Industry Studies Department, 1968).

TABLE II-A

LONG-TERM RISK RATIOS FOR SUCCESSFUL FIRMS

	Fixed Assets to Tangible Net Worth	Total Debt to Tangible Net Worth	Current Debt to Tangible Net Worth	Shareholder's Equity to Tangible Assets
Year 1				
mean	.518	5.013	4.231	.232
SD	.614	5.766	5.787	.141
skewness	1.646	1.491	1.809	.548
high	1.991	19.409	19.409	.499
low	.067	.739	.256	.049
num	12	12	12	12
Year 2				
mean	.983	4.185	3.743	.263
SD	2.284	3.672	3.129	.158
skewness	2.948	.789	.691	.711
high	8.189	11.003	9.511	.552
low	.057	.733	.262	.084
num	12	12	12	12
Year 3				
mean	.706	3.256	2.699	.273
SD	.931	2.702	2.255	.144
skewness	1.599	.796	.747	.538
high	2.989	8.577	7.155	.517
low	.035	.709	.464	.092
num	12	12	12	12
Year 4				
mean	.501	3.562	2.849	.308
SD	.761	3.465	2.866	.275
skewness	2.129	.798	1.075	1.476
high	2.524	9.462	9.312	.936
low	.009	.079	.079	.076
num	10	10	10	10
Year 5				
mean	.632	3.386	2.652	.275
SD	.724	3.197	2.537	.171
skewness	1.423	.908	1.352	.994
high	2.291	8.719	8.421	.648
low	.010	.552	.552	.058
num	9	9	9	9

SOURCE: Financial statements of 12 successful firms in the construction industry in a Central Alberta Community.

TABLE II-B

LONG-TERM RISK RATIOS FOR UNSUCCESSFUL FIRMS

	Fixed Assets to Tangible Net Worth	Total Debt to Tangible Net Worth	Current Debt to Tangible Net Worth	Shareholder's Equity to Tangible Assets
Year 1				
mean	0.324	0.146	-0.183	-0.696
SD	1.934	11.533	10.834	1.089
skewness	1.267	0.994	0.908	-0.815
high	5.350	27.193	25.217	0.697
low	-2.930	-14.731	-14.731	-2.777
num	12	12	12	12
Year 2				
mean	2.337	10.164	8.319	-0.093
SD	6.198	23.063	21.651	0.947
skewness	2.406	0.602	0.795	-2.801
high	20.812	57.297	57.297	0.585
low	-3.212	-28.864	-28.864	-3.041
num	12	10	10	12
Year 3				
mean	0.571	2.696	2.222	0.227
SD	0.615	9.975	9.677	0.215
skewness	1.473	-1.960	-2.073	1.041
high	2.085	13.914	11.987	0.697
low	-0.109	-24.737	-24.737	-0.049
num	10	11	11	11
Year 4				
mean	0.928	5.114	3.965	0.255
SD	0.653	4.731	2.936	0.139
skewness	0.229	1.328	1.179	0.228
high	1.994	14.710	9.540	0.495
low	.157	1.008	1.008	0.066
num	9	9	9	9
Year 5				
mean	14.571	5.679	5.376	0.261
SD	34.257	7.104	7.208	0.236
skewness	1.789	1.210	1.268	0.285
high	86.496	17.813	17.813	0.602
low	0.291	1.017	1.017	0.002
num	6	6	6	6

SOURCE: Financial statements of 12 unsuccessful firms in the construction industry in a Central Alberta Community.

TABLE II-C

KENDALL'S TAU FOR LONG-TERM RISK RATIOS

Year	Fixed Assets to Tangible Net Worth	Total Debt to Tangible Net Worth	Current Debt to Tangible Net Worth	Shareholder's Equity to Tangible Assets
1	0.417	0.556	0.556	0.764
2	-0.139	-0.149	-0.165	0.382
3	-0.016	-0.181	-0.212	0.272
4	-0.487	-0.199	-0.177	-0.133
5	-0.355	-0.143	-0.265	0.071

SOURCE: Financial statements of 12 successful and 12 unsuccessful firms in the construction industry in a Central Alberta Community.

year just prior to failure. The ranking of the ratio of shareholder's equity to tangible net worth indicated a trend from year 4 prior to failure, but this trend did not become pronounced until year 1. An analysis of the financial statements revealed that at approximately this point in time most owner/managers of the unsuccessful firms had begun to withdraw their personal loans which had been given to the company. All net personal loans to the company were classified as shareholder's equity when calculating ratios.

For all the years analyzed the dispersion of the long-term risk ratios of the unsuccessful firms was considerably larger than that of the successful firms. This would seem to indicate that as long as five years prior to failure some of the unsuccessful firms could have been placed in a marginal category. According to Kendall's tau (TABLE II-C) there were also some successful firms which were operating on the margin between success and failure.

The mean of the long-term risk ratios published by Dun & Bradstreet for the building industry differed little from the long-term risk ratios for the control group of this study. Dun & Bradstreet's ratios for 1968 were as follows:

Fixed assets to tangible net worth	-	102.4
Total debt to tangible net worth	-	415.9
Current debt to tangible net worth	-	302.9 [10]

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[10] Ibid.

However, the Dun & Bradstreet ratios for the building industry in Canada were calculated from the financial data of 6,771 building contractors that varied in asset size and sales volume from the smallest to the largest contractors in Canada.[11] It is suggested that a wide dispersion would result if the standard deviation were calculated from a sample presenting such a heterogeneous population. This wide dispersion might not effect the mean of the population and therefore would explain the similarity between the means of the long-term risk ratios of this study and the means of the long-term ratios published by Dun & Bradstreet.

The ratios classified under the long-term risk category revealed that both the successful and the unsuccessful firms operated primarily on funds from outside sources. The ratio of shareholder's equity to tangible assets indicated that the shareholders owned less than one third of the corporation's assets. This would appear to be quite realistic as most assets belonged to the current asset portion of the balance sheet and it is generally accepted that current assets be financed by current debt. Current assets in most cases were accounted for in current dollars and would not have their true value distorted by price level changes as did the fixed assets. But the small percentage of fixed assets relative to the total assets reduced the probability of distortion of any figures on the balance sheet and income statement because of the variety of acceptable methods of computing depreciation.

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[11] Ibid.

Another factor common to both the groups of successful and unsuccessful firms was the small amount of long-term debt outstanding in each firm. This was revealed by comparing the ratios of current debt to tangible net worth and total debt to tangible net worth. This was not in contrast to the theory as it was long-term debt and owner's equity that was used to finance fixed assets. The small percentage of fixed assets comprised in the total asset structure would suggest a small amount of long-term debt.

The ratio of fixed assets to tangible net worth was also used to aid an analyst in determining the extent of the owner's equity invested in fixed assets. As argued earlier, it was the funds available for long-terms that was supposed to finance fixed assets. Shareholder's equity was of a long-term nature in a business which was expected to continue in existence. The amount of the remaining shareholder's equity would represent the amount of funds made available by the owner's to finance everyday business activities, finance inventory and finance receivables. The ratio of fixed assets to tangible net worth revealed that the successful firms maintained a fairly constant percentage of the shareholder's equity invested in fixed assets. In the literature available in this area, it was not suggested as to what percentage of owner's equity should be invested in fixed assets, but it was suggested that this ratio could be used as a device to reveal trends in a firm over a period of years. Most of the successful firms analyzed in this study maintained approximately fifty to sixty

percent of the owner's equity invested in fixed assets. The unsuccessful firms had a larger percentage of owner's equity invested in fixed assets in the fourth and fifth year prior to failure, but later a gradual downward trend became evident. However, the ratio of the year prior to failure was distorted by the fact that most unsuccessful firms by this time had their owner's equity in a deficit figure as indicated by the negative ratio of shareholder's equity to total assets (see TABLE II-B).

The theory suggested that the debt to tangible net worth ratio was an indication of the stability of the capital structure of a firm.[12] A heavy liability structure would make it difficult for management to remain flexible and meet any unexpected financial obligation. Literature concerning key business ratios suggested that total debt should not exceed shareholder's equity.[13] If this was accepted as a normal position for a viable firm, then all the successful firms studied were exceptions to this situation.

The six ratios concerning risk that were discussed revealed no apparent trend prior to two years before failure. However, the second year prior to failure indicated that financial problems might be imminent in the case of some unsuccessful firms. The most noticeable difference

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[12]Roy A. Foulke, Practical Financial Statement Analysis (New York: McGraw-Hill Book Company, 1968).

[13]Ibid., p. 253.

between the successful and unsuccessful firms was in the case of the quick ratio. This would indicate that a large portion of the unsuccessful firms had inventory problems a number of years prior to failure. This inventory problem could have been a result of two factors: (1) the finished inventory was not sold, and/or (2) the firm was expanding beyond its means and attempting to finance too large a volume of work-in-process. These questions could be resolved quickly by the creditor requesting a personal interview with the debtor. The quick ratio of the unsuccessful firms showed that the accounts receivable and cash on hand would satisfy only twenty percent of the current debt on the year prior to failure. This was a definite reverse trend in relation to the successful firms which showed an increasing trend from year 5 to year 1.

IV. PROFITABILITY RATIOS

Profit Margin Ratios

The profitability of each firm was examined with the aid of three ratios mentioned earlier in the chapter. Negative ratios were encountered in both the successful and unsuccessful firms as a result of losses incurred during a particular year. Negative ratios during any one year did not necessarily indicate that a particular firm was destined to fail, but only two successful firms in the study had negative profit margin ratios in two consecutive years whereas it was quite common with the unsuccessful firms.

Probably the ratio of net profit to sales was the most important of all ratios as it showed the profitability of a firm. This could be a key ratio in assessing management's efficiency. The ratio of net profit to tangible net worth was another measure of a firm's profitability. If this ratio was low, the shareholders could probably have invested their money in a more profitable venture. This, however, was a controversial question as most owner/managers claimed that they would be more satisfied receiving a smaller return on their funds and be their own boss as opposed to receiving orders from someone else.

The ratio of net operating profit to sales[14] revealed the percentage of sales available to cover the indirect expenses and profit. This ratio was also required for calculating a firm's break-even point. TABLE III-A and TABLE III-B indicated that the gross margin of the unsuccessful firms was larger than that of the successful firms for each year except the year prior to failure. This was found to be a result of the difference in management salaries and discretionary expenses between the successful group and the failed group. This was revealed when one compared the net profit to sales ratios of TABLE III-A and TABLE III-B which showed a lower percentage net profit in the unsuccessful firms relative to the successful firms. Kendall's tau (TABLE III-C) disclosed a significant change in the ranking of the three profit margin ratios in year 2 and year 1 prior to failure. The ranking of

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[14]This ratio is more commonly called the gross margin.

TABLE III-A

PROFIT MARGIN RATIOS FOR SUCCESSFUL FIRMS

	Net Operating Proft to Sales	Net Profit to Sales	Net Profit to Tangible Net Worth
Year 1			
mean	0.110	0.040	0.604
SD	0.043	0.034	1.257
skewness	-0.476	1.593	2.970
high	0.169	0.127	4.579
low	0.028	0.012	0.051
num	12	12	12
Year 2			
mean	0.089	0.002	-0.014
SD	0.095	0.026	0.372
skewness	2.032	-0.980	-0.897
high	0.363	0.029	0.389
low	-0.041	-0.046	-0.760
num	12	12	12
Year 3			
mean	0.074	0.004	0.059
SD	0.056	0.042	0.454
skewness	0.706	-0.797	-1.281
high	0.184	0.061	0.616
low	-0.002	-0.087	-1.091
num	12	12	12
Year 4			
mean	0.077	0.019	0.334
SD	0.050	0.015	0.341
skewness	-0.042	-0.088	0.769
high	0.165	0.043	1.004
low	-0.019	-0.019	-0.013
num	10	10	10
Year 5			
mean	0.096	0.047	0.275
SD	0.044	0.063	0.310
skewness	1.678	1.942	1.075
high	0.204	0.204	0.935
low	0.055	-0.002	-0.021
num	9	9	9

SOURCE: Financial statements of 12 successful firms in the construction industry in a Central Alberta Community.

TABLE III-B

PROFIT MARGIN RATIOS FOR UNSUCCESSFUL FIRMS

	Net Operating Profit to Sales	Net Profit to Sales	Net Profit to Tangible Net Worth
Year 1			
mean	-0.032	-0.231	-1.004
SD	0.280	0.306	1.451
skewness	-0.936	-1.467	-1.889
high	0.289	0.145	0.872
low	-0.564	-1.020	-4.981
num	12	12	12
Year 2			
mean	0.121	-0.031	-1.011
SD	0.119	0.055	1.320
skewness	0.837	0.771	-0.739
high	0.383	0.097	0.422
low	-0.022	-0.114	-3.421
num	12	12	12
Year 3			
mean	0.170	-0.003	0.257
SD	0.178	0.082	0.310
skewness	2.008	-2.482	0.086
high	0.659	0.054	0.674
low	0.006	-0.231	-0.194
num	11	11	11
Year 4			
mean	0.183	0.059	0.504
SD	0.082	0.064	0.408
skewness	0.596	1.588	0.343
high	0.346	0.210	1.027
low	0.078	-0.001	-0.012
num	9	9	9
Year 5			
mean	0.140	0.019	1.340
SD	0.109	0.022	4.883
skewness	0.146	0.579	1.107
high	0.300	0.049	10.505
low	-0.004	0.001	-4.283
num	6	6	6

SOURCE: Financial statements of 12 unsuccessful firms in the construction industry in a Central Alberta Community.

TABLE III-C

KENDALL'S TAU FOR PROFIT MARGIN RATIOS

Year	Net Operating Profit to Sales	Net Profit to Sales	Net Profit to Tangible Net Worth
1	0.431	0.833	0.832
2	-0.180	0.544	0.463
3	-0.439	-0.174	-0.287
4	-0.820	-0.510	-0.235
5	-0.248	0.357	-0.213

SOURCE: Financial statements of 12 successful and 12 unsuccessful firms in the construction industry in a Central Alberta Community.

the profit margin ratios the three years preceding showed a ranking in favor of the unsuccessful firms.

An analysis of the financial statements exhibited a dissimilarity in the salaries drawn by the managers of the successful and unsuccessful firms. In the first few years of operation, the successful firms paid a very small portion of their gross profit in remuneration to management. This was not true of the unsuccessful firms. A large salary was paid to the management from the time the corporations began their operations until they ceased operations. This comparatively large remuneration was paid to management even after it became apparent that failure was imminent. However, the procedure appeared normal as the courts and trustees of bankruptcy found nothing fraudulent in this regard.

As a means of predicting failure, profit margin ratios gave no indication of a downward trend earlier than two years prior to failure. There were more firms that had losses in the beginning years of operations among the failed firms than among the control group, but the losses of any one firm did not continue year after year. The successful firms also showed a more stable profit pattern from year to year relative to the unsuccessful firms. This was not so evident when studying the mean and standard deviation of the profit margin ratios, but was disclosed when each firm was studied independently.

Dun & Bradstreet's published ratio on gross margin was similar to that of the successful firms, but the remaining profit margin ratios were considerably different. The ratio of net profit to sales was a smaller percentage compared to that found by Dun & Bradstreet, whereas the ratio of net profit to tangible net worth of the control group in this study suggested that on an average the shareholders of the successful firms earned more on their invested capital than the average across Canada in the building industry. Dun & Bradstreet's published profit margin ratios for the building industry across Canada for 1968 were as follows:

Gross margin	.131
Net profit to sales	.020
Net profits to tangible net worth	.130[15]

Asset Turnover Ratios

This group of ratios (TABLES IV-A, IV-B, and IV-C), probably more than any other ratios, is supposed to indicate the efficiency of management by reflecting the effective utilization of different assets. It would also seem reasonable to assume that the management of the successful firms would be more efficient than the management of the unsuccessful firms. Kendall's rank correlation in TABLE IV-C indicated that this was not the case except in the ratio of sales to inventory. Each of the five ratios in the asset turnover group did not rank as expected and Kendall's tau indicated no significant difference between

[15] Dun & Bradstreet, op. cit.

TABLE IV-A

ASSET TURNOVER RATIOS FOR SUCCESSFUL FIRMS

	Sales to Working Capital	Sales to Inventory	Accounts Receivable Collect Period in Days	Sales to Tangible Net Worth	Sales to Tangible Assets
Year 1					
mean	17.072	9.677	54.900	10.081	2.956
SD	13.769	8.747	25.186	7.421	1.699
skewness	1.551	0.660	0.049	0.230	0.280
high	49.967	24.421	92.300	22.133	5.551
low	3.322	1.657	22.400	0.876	0.874
num	9	8	10	11	11
Year 2					
mean	16.557	13.604	44.400	15.542	3.814
SD	8.829	10.673	27.696	10.640	2.665
skewness	-0.812	0.750	0.662	0.790	0.815
high	24.423	32.833	95.200	40.563	9.464
low	2.361	1.896	10.800	1.837	1.003
num	8	9	11	12	11
Year 3					
mean	23.434	14.809	39.730	12.210	3.723
SD	15.888	13.501	35.832	8.503	3.286
skewness	0.732	0.810	1.674	0.419	2.421
high	56.672	40.612	129.100	26.010	13.204
low	5.521	1.380	10.100	3.439	1.052
num	10	9	10	12	11
Year 4					
mean	17.718	3.460	28.137	10.158	3.484
SD	10.913	1.488	20.727	8.149	4.212
skewness	-0.201	-1.246	0.526	0.262	2.228
high	32.216	4.881	62.200	23.562	14.421
low	0.956	0.639	4.600	0.767	0.635
num	8	6	8	10	9
Year 5					
mean	11.893	7.469	37.325	8.865	2.521
SD	15.225	5.186	37.588	8.839	1.252
skewness	-0.994	0.809	1.452	1.843	0.142
high	25.362	15.621	117.000	30.062	4.781
low	.000	2.781	14.600	1.093	0.429
num	7	5	8	9	8

SOURCE: Financial statements of 12 successful firms in the construction industry in a Central Alberta Community.

TABLE IV-B

ASSET TURNOVER RATIOS FOR UNSUCCESSFUL FIRMS

	Sales to Working Capital	Sales to Inventory	Accounts Receivable Collect Period in Days	Sales to Tangible Net Worth	Sales to Tangible Assets
Year 1					
mean	16.401	6.503	46.342	9.768	2.992
SD	0.000	6.070	34.162	5.271	2.293
skewness	0.000	0.684	0.548	-0.000	0.609
high	16.401	18.205	109.400	13.495	7.191
low	16.401	0.452	7.800	6.041	0.412
num	1	10	10	2	12
Year 2					
mean	13.083	6.253	45.800	20.255	2.185
SD	3.391	5.485	28.546	16.358	1.978
skewness	0.021	0.436	0.655	0.615	1.208
high	16.493	14.505	98.500	50.931	6.650
low	9.711	0.369	11.800	0.763	0.283
num	3	12	12	9	12
Year 3					
mean	20.753	7.971	46.510	16.748	2.661
SD	24.240	5.396	18.136	11.290	1.433
skewness	1.674	0.995	-0.433	0.595	1.921
high	69.493	19.297	72.900	38.085	6.421
low	7.224	1.434	13.900	2.165	1.266
num	6	9	10	10	10
Year 4					
mean	14.447	9.150	47.156	14.619	2.834
SD	7.186	11.397	30.576	8.574	1.234
skewness	-0.326	1.797	0.806	1.246	-0.744
high	22.937	34.215	109.900	34.208	4.057
low	3.322	1.138	10.800	3.941	0.745
num	6	7	9	9	9
Year 5					
mean	23.334	20.070	38.500	17.442	3.063
SD	15.481	21.735	37.285	12.777	1.261
skewness	0.666	1.039	1.122	0.686	0.194
high	41.095	56.213	107.200	36.475	5.045
low	12.697	1.463	9.200	7.548	1.281
num	3	5	6	5	6

SOURCE: Financial statements of 12 unsuccessful firms in the construction industry in a Central Alberta Community.

TABLE IV-C

KENDALL'S TAU FOR ASSET TURNOVER RATIOS

Year	Sales to Working Capital	Sales to Inventory	Accounts Receivable Collect Period in Days	Sales to Tangible Net Worth	Sales to Tangible Assets
1	-0.040	0.272	0.215	0.000	0.060
2	0.331	0.435	-0.060	-0.163	0.393
3	0.218	0.185	-0.360	-0.165	0.308
4	0.204	-0.521	-0.360	-0.288	-0.284
5	-0.360	-0.360	0.082	-0.469	-0.286

SOURCE: Financial statements of 12 successful and 12 unsuccessful firms in the construction industry in a Central Alberta Community.

the ranking of the successful and unsuccessful firms.

The rejection limits previously mentioned were used to eliminate firms which had a working capital balance that was negative or approaching zero. The same method was used to eliminate firms which had a debit balance in their shareholder's equity account. As a result of these rejection limits, fewer firms were used in calculating the ratios of sales to working capital and sales to tangible net worth than were analyzed in the study. Most of the firms rejected were from the unsuccessful firms that had a relatively high working capital and tangible net worth were present in the ranking.

The average collection period of accounts receivable indicated no significant difference between the successful and unsuccessful firms. Also, the collection period remained relatively constant, with but one exception, over the five years studied. This one exception was the collection period for year 1 of the successful firms which showed a marked increase. This might be an indication that these firms had reached a financial position where they could extend their credit for a longer period of time. The accounts receivable written-off as bad debts by both the groups of firms was negligible for all the years analyzed which suggested a good credit policy for all the firms.

The ratio of sales to working capital showed no material difference between the two groups of firms (TABLES IV-A and IV-B). However, as mentioned previously due to the rejection of a number of

firms from the unsuccessful group little confidence could be place on this ratio.

The ratio of sales to inventory revealed that the successful firms turned over their inventory at a faster rate than the unsuccessful firms. This had a direct relationship with the quick ratio which indicated that the failed firms invested a much larger percentage of their current assets in inventory than the successful firms. Thus it was expected that their turnover would be slower. Years four and five were exceptions, but this was also correlated with the quick ratio for these two years as a negative relationship was found between the successful and unsuccessful firms.

The ratio of sales to tangible net worth suffered from the same faults as the working capital turnover ratio because a number of firms were rejected with a debit balance in the shareholder's equity account. It was expected that the tangible net worth turnover would be more rapid in the failed group because of the smaller amounts invested by the owner/manager. It could be debated as to whether the owners/managers of the failed firms lacked the funds to invest or whether they lacked the confidence and optimism of the successful group who appeared willing to invest more of their own funds.

The sales to total asset ratio gave an indication of asset productivity, and when used in conjunction with other ratios, should reveal the main problems. The data suggested (TABLES IV-A and IV-B)

that there was no discernible difference in the asset productivity between the two groups a year prior to failure. This was also revealed by Kendall's rank correlation (TABLE IV-C). Years, two, three, and four preceding failure indicated that on an average the successful firms employed their assets in a more productive manner, but these years showed a greater dispersion in the asset productivity of the successful firms as compared to the unsuccessful firms. Kendall's tau confirmed that the successful firms ranked above the unsuccessful firms for years two and three, but showed a reverse for years four and five.

The above analysis concerning asset turnover ratios revealed that inventory might be a valuable means of predicting failure. The other ratios in this group revealed no significant difference between the successful and unsuccessful firms. Dun & Bradstreet's published ratios were not comparable to either the successful or failed group. Their published ratios were as follows:

Sales to inventory	3.80
Sales to tangible net worth	6.61
Collection period	76 days[16]

V. SUMMARY

Seven of the fourteen ratios which were used in this study appeared to be useful to creditors in assessing the risk involved while issuing credit. The short-term risk ratios, current ratio and quick

[16] Ibid.

ratio, appeared to give a positive indication at least two years prior to failure. The long-term risk ratios also showed a trend towards financial difficulties in the two years preceding failure. These long-term risk ratios were computed with shareholder's equity in either the numerator or denominator; thus, were a function of profitability of the firm. This followed from shareholder's equity consisting of the owner's investment plus or minus retained profits. This should indicate some correlation between these long-term risk ratios and the net profit to sales ratio, which there appeared to be as this ratio also indicated problems prior to failure.

The other ratio that appeared to indicate inefficient management was the sales to inventory ratio. This ratio as was expected, revealed a trend in close proximity to the quick ratio.

Two other ratios, sales to working capital and sales to tangible net worth, were studied with little confidence because of the small number of firms used in calculating the mean, standard deviation, and Kendall's tau in the case of the unsuccessful firms. However, when working capital and/or tangible net worth approach zero or become negative, it should be an indication for creditors to pursue further information regarding that firm.

CHAPTER VI

SUMMARY AND CONCLUSION

I. SUMMARY

The primary objective of this study was to examine the effectiveness of financial ratios as a means of predicting business failure. A number of studies had been done in an attempt to evaluate the usefulness of financial ratios for this purpose. Some of the important studies in the area were reviewed. This study was designed in a manner to remove the weakness of the prior studies and, thereby, make financial ratio analysis more useful.

Twelve building contractors from a Central Alberta Community that were petitioned into bankruptcy or were voluntarily liquidated between the years 1963 and 1967 were analyzed. These firms constituted a hundred per cent sample of failed building contractors in this area during that period. Fourteen standard financial ratios were calculated using the data from the financial statements of these unsuccessful firms. The arithmetic mean, standard deviation, skewness, the high, and the low for each of the fourteen ratios of the twelve firms was calculated. Twelve successful firms of the same industry, size, and location were also analyzed in the same manner. Financial ratios of the successful firms were compared to find similarities and differences

between the two groups. Kendall's rank correlation was used to emphasize these differences by ranking the successful firms against the unsuccessful firms.

By selecting the two groups of firms which were homogeneous from the viewpoint of size, industry, and location, it was considered the comparisons between the ratios of the unsuccessful and successful firms would be more meaningful. If significant differences were revealed between the financial ratios of the successful and unsuccessful firms, then they could be interpreted to make predictions with regard to the probability of success or failure of firms in the building industry.

Risk and profitability were selected as the two key variables to measure the efficiency of management. Risk was measured with the help of short and long-term standard risk ratios. The profitability was measured by the profit margin ratios and asset turnover ratios.

Trade supply creditors were surveyed in order to find the importance of various factors, particularly financial ratios that determine their credit policies. The results indicated that financial ratio analysis was employed by approximately fifty percent of the trade suppliers interviewed. Personal interview as most often used for determining the credit potential of customers. Personal interviewwas used to a greater extent primarily because of the difficulties encountered when financial statements were requested from the customers.

II. CONCLUSION

The findings of the study suggested that risk ratios predicted failure better than the profitability ratios. The short-term risk ratios gave a positive indication of failure two years prior to the actual event. The quick ratio indicated a downward trend as much as three years prior to failure. This would suggest the beginning of inventory problems at that time. This was confirmed by the inventory turnover ratio. However, the trend in this ratio did not become significant until two years prior to failure. The unsuccessful firms tended to have a higher, rather than a lower, inventory balance relative to the other current assets. It was found that some successful firms were operating with a lower current and quick ratios than that displayed by some firms that had failed. Thus, it appeared that some of the firms that were classified as successful were operating on the margin between success and failure.

The long-term risk ratios revealed that both of the groups of the successful and the unsuccessful firms operated with a small amount of long-term debt and the total debt exceeded the shareholder's equity. This was contrary to the theory which maintained that the shareholders should finance the greater portion of the assets of a company.

Kendall's rank correlation disclosed that only a small percentage of the total number of successful firms were operating with higher long-term risk ratios than some unsuccessful firms. Therefore, it suggested that long-term risk ratios could be used as a means of predicting failure in the majority of cases. The marginal cases would have to be determined with the help of some other factors.

Profit margin ratios did not display the same consistency as was displayed by the risk ratios in distinguishing the successful firms from the unsuccessful firms. As a result less confidence could be expressed in these ratios relative to the risk ratios. However, profit margin analysis did disclose that the remuneration paid to the owner/managers of the unsuccessful firms was substantially greater than that paid to the owner/managers of the successful firms during the early years of a firm's operations. This appeared to be an important contributing factor to failure. Shareholder's loans also appeared to be an important factor in determining success or failure.

The ratio of inventory to sales appeared to be the only asset turnover ratio that could be useful in predicting failure. The remainder of the ratios in this group should be used with skepticism when comparing firms.

The study indicated that seven ratios out of a total of fourteen were useful in predicting the solvency of a firm in the building industry at least two years prior to the event. These ratios included six

risk ratios and the inventory turnover ratio. This finding contradicted prior studies of this nature.

This writer recommends that further studies should be conducted in other industries on a group of homogeneous firms from the viewpoint of size, industry, and location. The published financial ratios should also be segregated with respect to firm size, industry, and location in order to be more meaningful for creditors.

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APPENDICES

APPENDIX A

TABLE A - I

SUMMARY STATISTICS OF ESTATES CLOSED DURING
1964 UNDER THE BANKRUPTCY ACT

BANKRUPTCIES UNDER GENERAL PROVISIONS OF THE ACT[1]

Province or Territory	Estates Closed	Assets as Estimated by Debtors	Liabilities as Estimated by Debtors	Realization by Trustee	Costs of Administration	Costs of Percentage of Realization
	No.	$	$	$	$	
Nfld.	--	--	--	--	--	--
P.E.I.	8	190,094	689,762	93,797	10,992	12
N.S.	19	2,736,734	3,988,485	575,449	103,121	18
N.B.	13	161,045	343,902	49,358	15,039	31
Que.	1,426	17,040,244	36,449,096	4,084,033	1,689,588	41
Ont.	1,229	31,706,117	57,470,353	12,204,272	2,254,172	18
Man.	38	2,369,664	2,955,936	151,734	63,854	42
Sask.	33	206,341	794,495	67,872	24,714	36
Alta.	92	4,786,501	8,080,437	2,033,061	445,009	22
B.C.	113	7,392,902	12,698,668	2,342,872	574,936	24
N.W.T.	1	58,680	151,418	5,473	3,100	57
Totals	2,972	66,648,322	123,622,552	21,607,921	5,184,525	24

[1]Includes summary administration provisions of the Bankruptcy Act.

SOURCE: Canada Year Book, 1967 edition, Dominion Bureau of Statistics.

APPENDIX A

TABLE A - II

BANKRUPTCIES AND INSOLVENCIES UNDER FEDERAL LEGISLATION, BY PROVINCE, 1956-1965

Year	Atlantic Provinces	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total
	No.	No.	No.	No.	No.	No.	No.	No.
1956	37	1,265	507	23	34	41	60	1,967
1957	54	1,359	630	26	32	55	57	2,213
1958	36	1,376	545	28	18	51	71	2,125
1959	36	1,366	658	26	20	47	76	2,229
1960	48	1,638	914	34	28	46	120	2,828
1961	47	1,450	932	39	25	62	104	2,659
1962	33	1,694	1,177	47	36	94	109	3,190
1963	60	1,987	1,389	45	37	67	92	3,677
1964	67	1,872	1,281	53	30	80	116	3,499
1965	43	1,748	1,248	41	22	103	90	3,295

SOURCE: Canada Year Book, 1967 edition, Dominion Bureau of Statistics.

APPENDIX A

TABLE A - III

BANKRUPTCIES AND INSOLVENCIES UNDER FEDERAL LEGISLATION, BY BRANCH OF BUSINESS, 1956-65

Year	Extractive Industries & Mining	Manufacturing	Construction	Transportation	Trade	Finance & Public Utilities	Service	Not Classified	Total
	No.	No.	No.	No.	No.	No.	No.	No.	No.
1956	58	342	375	83	782	28	246	53	1,967
1957	80	366	372	109	928	40	244	74	2,213
1958	67	356	367	105	882	42	295	11	2,125
1959	81	374	449	76	906	36	307	--	2,229
1960	100	323	619	129	1,229	65	363	--	2,828
1961	86	285	470	113	1,234	69	402	--	2,659
1962	93	326	573	143	1,496	82	477	--	3,190
1963	111	365	714	166	1,634	110	577	--	3,677
1964	146	327	706	181	1,492	92	555	--	3,499
1965	151	346	628	193	1,359	115	503	--	3,295

SOURCE: Canada Year Book, 1967 edition, Dominion Bureau of Statistics.

APPENDIX A

TABLE A - IV

ESTIMATED LIABILITIES OF BANKRUPTCIES AND INSOLVENCIES, 1956-1965

Year	Atlantic Provinces	Quebec	Ontario	Prairie Provinces	British Columbia	Total
	$'000	$'000	$'000	$'000	$'000	$'000
1956	2,049	32,704	21,842	5,223	2,437	64,254
1957	2,508	37,266	31,349	5,683	3,056	79,863
1958	4,493	40,250	17,884	4,672	5,479	72,778
1959	2,302	50,034	34,156	3,866	5,429	95,786
1960	3,568	61,851	91,090	7,732	10,307	174,548
1961	4,714	49,133	48,352	7,075	7,246	116,520
1962	2,566	77,002	55,946	6,843	7,083	149,440
1963	3,788	91,467	84,260	8,330	7,757	195,602
1964	5,863	111,172	71,193	12,144	8,362	208,734
1965	2,513	107,182	258,934	15,234	9,787	393,650

SOURCE: Canada Year Book, 1967 edition, Dominion Bureau of Statistics.

APPENDIX B

Questionnaire guide employed as an aid when the trade suppliers were interviewed.[1]

1. Do you have a credit policy, which you use as a guideline when dealing with unsecured creditors?

Always	(60)
Frequently	(24)
Sometimes	
Rarely	(16)
Never	

2. Credit is a service to customers as opposed to a method of promoting sales and stimulating demand.

Strongly agree	(24)
Agree	(48)
Neither agree nor disagree	(8)
Disagree	(20)
Strongly disagree	

3. A firm should operate on a credit sales maximization policy rather than a credit loss minimization policy.

Strongly agree	(24)
Agree	(32)
Neither agree nor disagree	(12)
Disagree	(24)
Strongly disagree	(8)

[1]The figure in brackets after each choice for a particular question indicates the percentage of responses to that choice.

4. Products with a relatively high gross profit margin should be sold to higher credit risks than products with a lower contribution to overhead and profits.

Strongly agree	(12)
Agree	(12)
Neither agree nor disagree	(24)
Disagree	(32)
Strongly disagree	(20)

5. Before issuing large amounts of credit to a small construction firm, the creditor should be concerned with, and inquire into the company goals and personal aspirations of the creditee.

Absolutely true	(28)
Probably true	(32)
Open to question	(24)
Probably false	(16)
Absolutely false	

6. Personal interviews should always be conducted with the creditee upon issuing credit and at periodic intervals thereafter.

Certainly so	(64)
Probably so	(20)
Hard to say	(8)
Probably not so	(8)
Certainly not so	

7. A creditor should inquire into the owner-manager's educational training and past experience before issuing credit.

Strongly agree	(40)
Agree	(20)
Neither agree nor disagree	(32)
Disagree	(8)
Strongly disagree	

8. A firm should have a flexible credit policy which varies with the economic conditions and economic outlooks.

Strongly agree	(44)
Agree	(56)
Neither agree nor disagree	
Disagree	
Strongly disagree	

9. Management and/or the internal control people measure the effectiveness of our Credit department.

Always	(60)
Frequently	(32)
Sometimes	(8)
Rarely	
Never	

10. When we ask to review the financial statements of the construction firm to which we are issuing credit, we are granted this privilege.

Always	
Frequently	(16)
Sometimes	(48)
Rarely	(20)
Never	(16)

11. In determining credit risk, what factors do you consider to be most important? (Please rank in order of most important to least important). Please indicate any other factors you think are important.

Financial conditions	(1)
Management	(1)
Trade payment experience of firm	(3)
Profitability of firm	(4)
Rating of a credit bureau	(5)

12. Which intangible factor do you believe to be the most important attribute of management for success in the construction industry? (Please rank from most important to least important). Please indicate any other factors you think are important.

Persistence	(3)
Optimism	(4)
Personality	(2)
Education and training	(1)
Other personal traits (please list)	

13. Do you always request interviews with and discuss the business with your marginal accounts?

Always	(36)
Frequently	(44)
Sometimes	(20)
Rarely	
Never	

14. Once an account becomes marginal and/or the payments become progressively slower, do you issue this account further credit?

Always	
Frequently	(8)
Sometimes	(42)
Rarely	(42)
Never	(8)

15. What per cent of your marginal accounts do you eventually collect from?

Nearly all	(44)
More than 50 per cent	(56)
About 50 per cent	
Less than 50 per cent	
Very few	

16. Banks and other credit institutions frequently stipulate the maximum drawings or loans which the owner/manager can receive from the firm; do you feel trade creditors should have the same privilege?

Strongly agree	(40)
Agree	(28)
Neither agree nor disagree	(20)
Disagree	(12)
Strongly disagree	

17. Do you inquire into the company plans, both short range and long range?

Always	(8)
Frequently	(36)
Sometimes	(28)
Rarely	(20)
Never	(8)

18. Do you use a credit bureau's, such as Dun and Bradstreet, credit rating and discuss the creditee's credit potential with his banker before establishing the credit ceiling for that particular firm?

Always	(24)
Frequently	(36)
Sometimes	(16)
Rarely	(16)
Never	(8)

19. Trade credit provides the major portion of financing for small business, therefore, these creditors should be given cash budgets and/or projected funds flow and other statements on request from the creditee.

Strongly agree	(28)
Agree	(40)
Neither agree nor disagree	(32)
Disagree	
Strongly disagree	

20. Financial ratios are a valuable tool to use in determining the solvency and profitability of a firm.

Absolutely true	(56)
Probably true	(28)
Open to question	(16)
Probably false	
Absolutely false	

21. Does your firm use financial ratios which have been computed for an industry or group of firms as a basis for comparing those of your small business customers?

Always	(8)
Frequently	(16)
Sometimes	(32)
Rarely	(24)
Never	(20)

22. What is your source of financial ratios and which ratios do you feel are of the most value?

23. Do you as a firm ever compute financial ratios to employ as a basis for comparison?

Yes - 32

Rarely- 16

No - 52

24. All firms, regardless of size, should have an annual audit by a chartered accountant.

Certainly so	(64)
Probably so	(12)
Hard to say	(8)
Probably not so	(8)
Certainly not so	(8)

25. Does your firm offer financial advice to your small business customers?

Always	
Frequently	(28)
Sometimes	(48)
Rarely	(12)
Never	(12)

26. The small businessman would be more likely to succeed if a long-term loan were more readily available locally for operating his business.

Certainly right	(16)
Probably right	(32)
Doubtful	(52)
Probably wrong	
Certainly wrong	

27. It is in the suppliers' interest to keep their outlets alive. For this reason alone, the small businessman who has difficulty getting along with his suppliers is likely to have already moved well along the road to failure.

Always	(28)
Frequently	(40)
Sometimes	(32)
Rarely	
Never	